



CHARLES B. GORDON  
THOMAS P. SCHILLER  
DAVID B. DEIOMA  
JEFFREY J. CORSO  
HOWARD G. SHIMOLA  
JEFFREY J. SOPKO  
JOHN P. MURTAUGH  
JAMES M. MOORE  
MICHAEL W. GARVEY  
RICHARD A. SHARPE  
RONALD M. KACHMARIK  
PAUL A. SERBINOWSKI

10,009,075

CD C

PEARNE & GORDON LLP  
ATTORNEYS AT LAW  
1801 EAST 9th STREET  
SUITE 1200  
CLEVELAND, OHIO 44114-3108  
TEL: (216) 579-1700 FAX: (216) 579-6073  
EMAIL: ip@pearnegordon.com

STEPHEN S. WENTSLER  
BRIAN G. BEMBENICK  
AARON A. FISHMAN  
ROBERT F. BODI  
SUZANNE B. GAGNON  
UNA L. SCHUMACHER  
STEVEN J. SOLOMON  
GREGORY D. FERNENGEL  
OF COUNSEL  
LOWELL L. HEINKE  
THADDEUS A. ZALENSKI  
PATENT, TRADEMARK,  
COPYRIGHT AND RELATED  
INTELLECTUAL PROPERTY LAW

July 26, 2004

Mail Stop Certificate of Corrections Branch  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Re: U.S. Patent No.: 6,749,768 B2  
Issued: June 15, 2004  
Inventor: Masami Endo et al.  
Our Docket: 34094

Certificate  
JUL 30 2004  
of Correction

Sir:

A Certificate of Correction under 35 U.S.C. 254 is hereby requested to correct Patent Office printing errors in the above-identified patent. Enclosed herewith is a proposed Certificate of Correction (Form No. PTO-1050) for consideration along with appropriate documentation supporting the request for correction.

It is requested that the Certificate of Correction be completed and mailed at an early date to the undersigned attorney of record. The proposed corrections are obvious ones and do not in any way change the sense of the application.

We understand that a check is not required since the errors were on the part of the Patent and Trademark Office in printing the patent.

Very truly yours,

Jeffrey J. Sopko, Reg. No. 27676

JJS:vln  
Enclosures

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date indicated below.

\_\_\_\_\_  
Jeffrey J. Sopko  
Name of Attorney for Applicant(s)

July 26, 2004

AUG 03 2004

**UNITED STATES PATENT AND TRADEMARK OFFICE**  
**CERTIFICATE OF CORRECTION**

PATENT NO. : 6,749,768 B2  
DATED : June 15, 2004  
INVENTOR(S) : Masami Endo et al.

PAGE 1 OF 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Column 17, line 60, please delete "G11z" and insert therefor -GHz-.

Column 21, line 51, please delete "Th" and insert therefor -To-.

MAILING ADDRESS OF SENDER:

Jeffrey J. Sopko  
Pearne & Gordon LLP  
1801 East 9th Street  
Suite 1200  
Cleveland, Ohio 44114-3108

PATENT NO. 6,749,768 B2

No. of additional copies

➡ 0

AUG 03 2004



sample No. 2 where no substitution with Sr is performed, and shows an excellent value of 3.5 or higher. In Fig. 40,  $\mu''$  shows substantially the same tendency as  $\mu'$ , and the samples No. 30 to No. 32 where  $\text{BaCO}_3$  is substituted with  $\text{SrCO}_3$  by 20% to 35% show particularly high  $\mu''$ . From the above results, it was made clear that there existed an optimal amount of Sr for substitution in order to obtain high  $\mu'$  and  $\mu''$ .

Toroidal cores created by using the milled powder of the samples No. 28 and No. 29 that were calcined at 1300°C and the samples No. 30 to No. 34 that were calcined at 1250°C were inserted to the coaxial tube sample holder, and the complex permeability ( $\mu'$ ,  $\mu''$ ) in the high frequency range (50 MHz to 1.8 GHz) was measured by using an impedance analyzer (manufactured by Hewlett-Packard Ltd.). Fig. 18 shows the results together with the measurement result of the sample No. 2. In Fig. 18,  $\mu'$  of the toroidal cores by the samples No. 30 to No. 32 exceeds that of the sample No. 2 containing no  $\text{SrCO}_3$ , and the flat portions of  $\mu'$  extend to a higher frequency range than that of the sample No. 2. Therefore, it was found out that the material having a high permeability and excellent high frequency characteristic could be obtained by substituting  $\text{BaCO}_3$  with  $\text{SrCO}_3$  by 20% to 35%. The flat portions of  $\mu'$  regarding the samples No. 28, No. 29, No. 33 and No. 34 also extend to the higher frequency range, implying that they can be used in the higher frequency range.

In Fig. 18, the peak value of  $\mu''$  for the sample No. 2 containing no  $\text{SrCO}_3$  was obtained at the frequency of about 1.5 GHz. On the other hand, the peak value of  $\mu''$  for the sample No. 28 (8% substitution) where a portion of  $\text{BaCO}_3$  was substituted with  $\text{SrCO}_3$  is obtained at the frequency of about 5.5 GHz, and it is understood that the peak value of  $\mu''$  shifted to the higher frequency side. Similarly,  $\mu''$  of the samples No. 29 to No. 34 were measured, and the peak value of  $\mu''$  was obtained at the frequency of: 4.0 GHz with regard to the sample No. 29 (16% substitution); 2.6 GHz with regard to the sample No. 30 (20% substitution); 2.0 GHz with regard to the sample No. 31 (25% substitution); 2.8 GHz with regard to the sample No. 32 (35% substitution); 3.8 GHz with regard to the sample No. 33 (50% substitution); and 4.0 GHz with regard to the sample No. 34 (75% substitution). Specifically the peak value of  $\mu''$  for the samples No. 28 to No. 34 where a portion of  $\text{BaCO}_3$  was substituted with  $\text{SrCO}_3$  is obtained at the frequency of about 2.0 GHz or higher, and the peak value of  $\mu''$  shifted to the

JUL 28 2004  
PATENT & TRADEMARK OFFICE

the magnetic ferrite material was maintained even when the sintering aids A to C, that is,  $\text{Bi}_2\text{O}_3$  based glass was added.

Next, when the sample No. 40 and the sample No. 57 are compared,  $\mu'$  of the sample No. 40 is 2.25, and  $\mu'$  of the sample No. 57 is 3.12. Here, the sintering aid A is added to the sample No. 40 by 7.0 wt%, and the sintering aid A and CuO are added to the sample No. 57 by 3.0 wt% respectively, that is, 6.0 wt% in total. The sample No. 57 having the total amount of additive of 6.0 wt% shows higher  $\mu'$  than  $\mu'$  of the sample No. 40 having the total amount of additive of 7.0 wt%. Therefore, it was found out that a smaller added amount could increase  $\mu'$  when the sintering aid A and CuO were added in combination. The same thing as the sample No. 39 and the sample No. 57 applies to the samples No. 44 and No. 60, and the samples No. 47 and No. 63.

The following tendency has been shown with regard to the imaginary part  $\mu''$  (hereinafter, referred to as  $\mu''$  as appropriate) of complex permeability. Specifically, the permeability  $\mu''$  of the samples No. 57 to No. 65 to which the sintering aids A to C and CuO were added in combination improved in comparison with the cases where only the sintering aids A to C were added (the samples No. 38 to No. 40, and No. 42 to No. 47).

From the above results, it was found out that the permeability  $\mu'$  and  $\mu''$  improved when  $\text{Bi}_2\text{O}_3$  based glass and CuO were added in combination in comparison with the case where only  $\text{Bi}_2\text{O}_3$  based glass was added. To obtain good permeability  $\mu'$  and  $\mu''$ , it is desirable that  $\text{Bi}_2\text{O}_3$  based glass and CuO are added by 1 wt% to 20 wt% in total, more desirably about 3 wt% to 15 wt%.

#### (Example 9)

Cores of a toroidal shape were created by using the milled powder of the samples No. 57 to No. 59 (the sintering aid A+CuO), the samples No. 60 to No. 62 (the sintering aid B+CuO) and the samples No. 63 to No. 65 (the sintering aid C+CuO) in the same step as Example 8. The peak value of the mean grain size distribution of each sample is 1.0  $\mu\text{m}$  and the specific surface area is 9  $\text{m}^2/\text{g}$ . The permeability of the obtained cores was measured in the same manner as Example 8. Note that the measurement was performed for the frequency range up to 10 GHz in Example 9. Fig. 21 to Fig. 23 show the results together with the measurement result of the sample No. 56 ( $\text{Bi}_2\text{O}_3$  and CuO were added by 5 wt% respectively). Fig. 21